

Vermont's Clean Water Projects Tracking

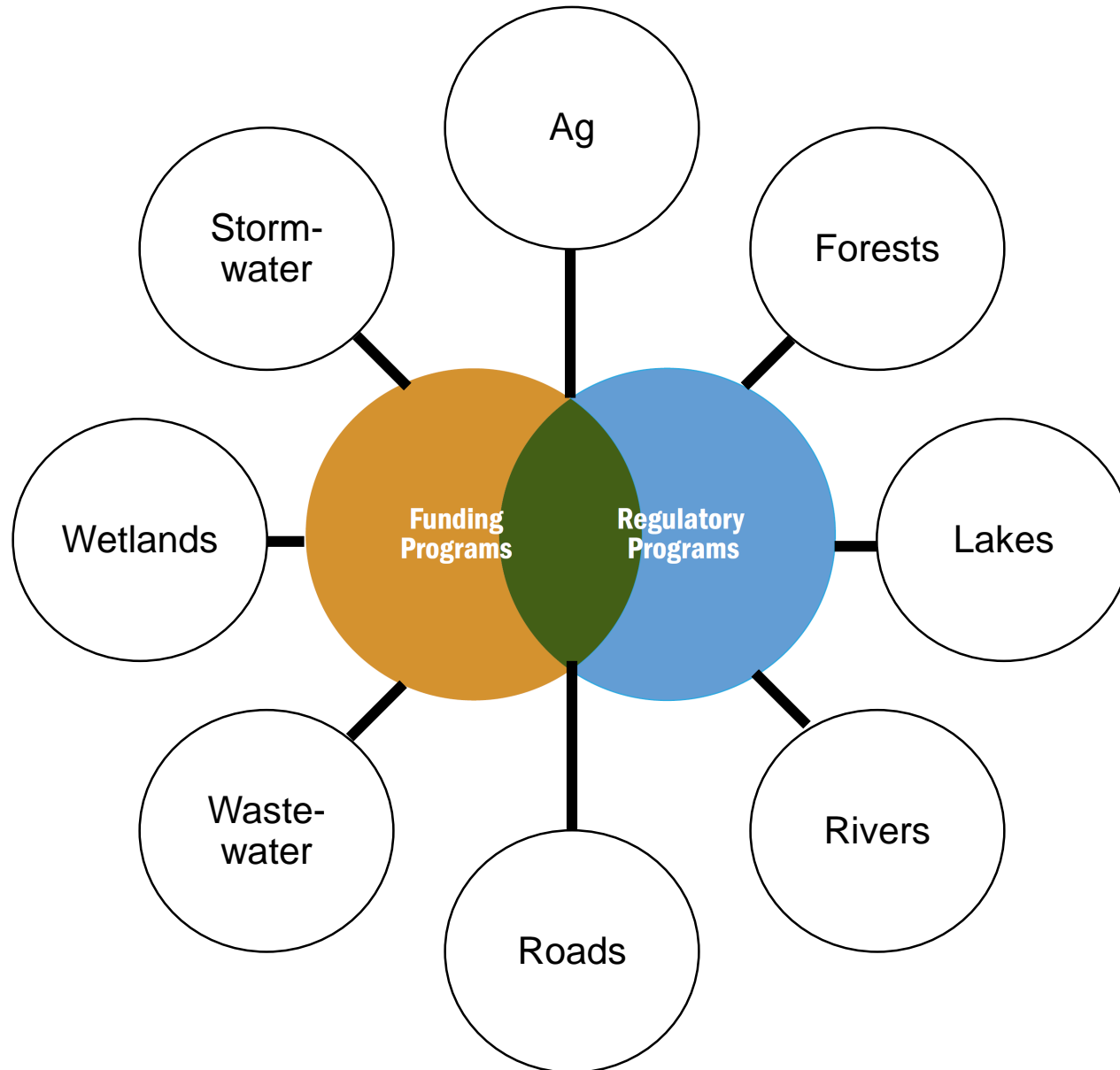
Emily Bird and Helen Carr
DEC Clean Water Initiative
Program

January 18, 2018

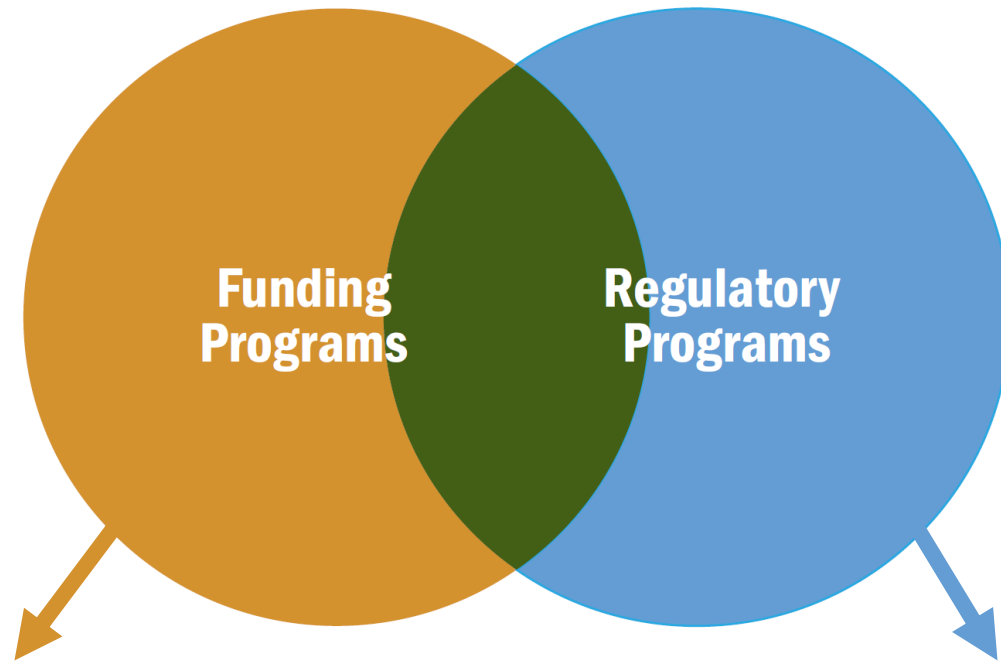


AGENCY OF ADMINISTRATION
AGENCY OF AGRICULTURE, FOOD & MARKETS
AGENCY OF COMMERCE & COMMUNITY DEVELOPMENT
AGENCY OF NATURAL RESOURCES
AGENCY OF TRANSPORTATION

Tracking Clean Water Activities



Tracking Clean Water Activities



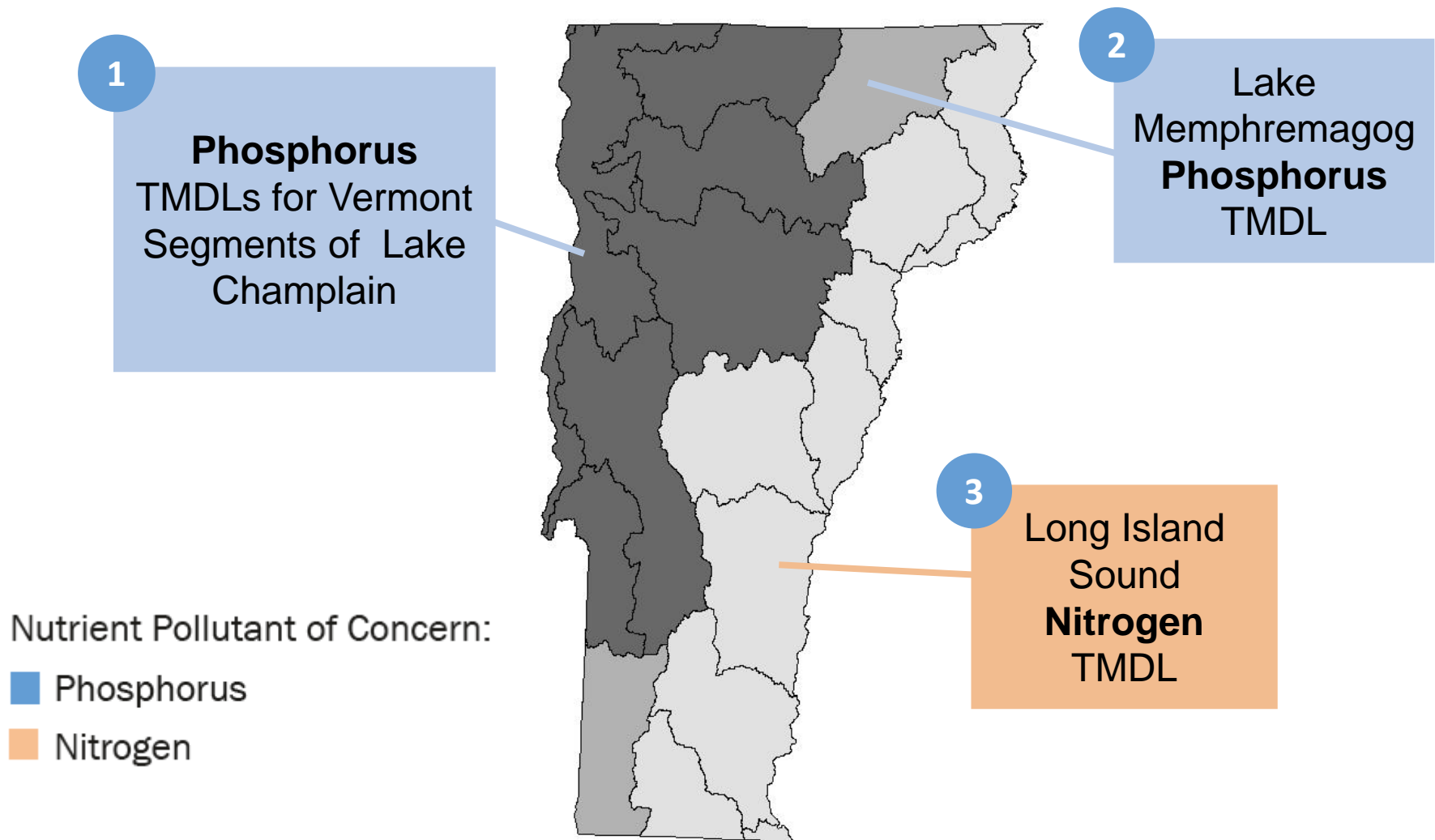
Funding Programs

Projects/best management practices completed through state funding programs and other programs where data available (e.g., federal, local)

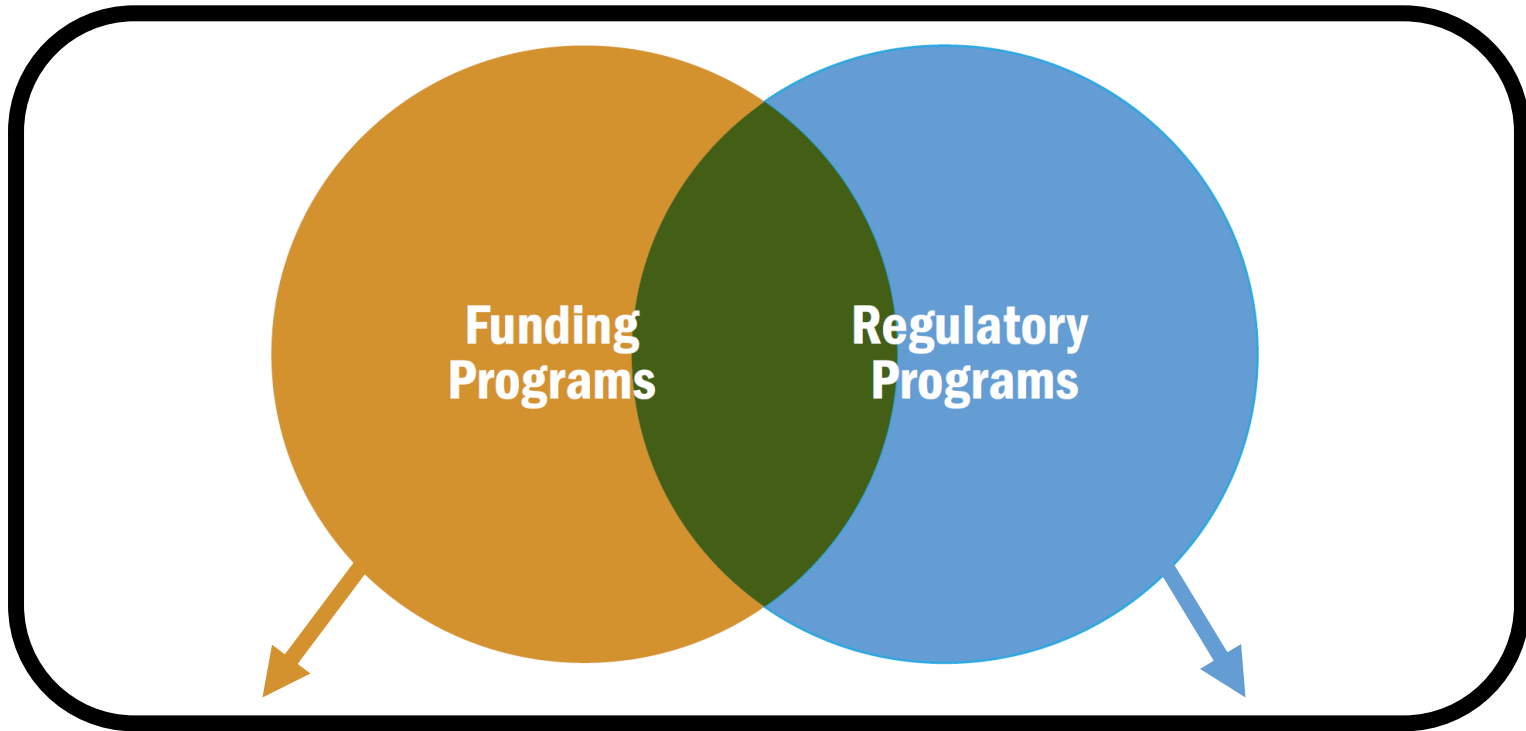
Regulatory Programs

Projects/best management practices completed to comply with water quality regulations for agriculture, stormwater, and wastewater

Nutrient Pollutant Reductions Required by Pollution Control Plans (i.e., TMDLs)



Tracking TMDL Implementation



Funding Programs

Projects/best management practices completed through state funding programs and other programs where data available (e.g., federal, local)

Regulatory Programs

Projects/best management practices completed to comply with water quality regulations for agriculture, stormwater, and wastewater

Lake Champlain TMDL Accountability Framework

TMDL establishes phosphorus targets



TBP I.D. five-year interim phosphorus planning targets



TBP I.D. priority actions to meet five-year planning targets



Track actions implemented via regulatory/funding programs



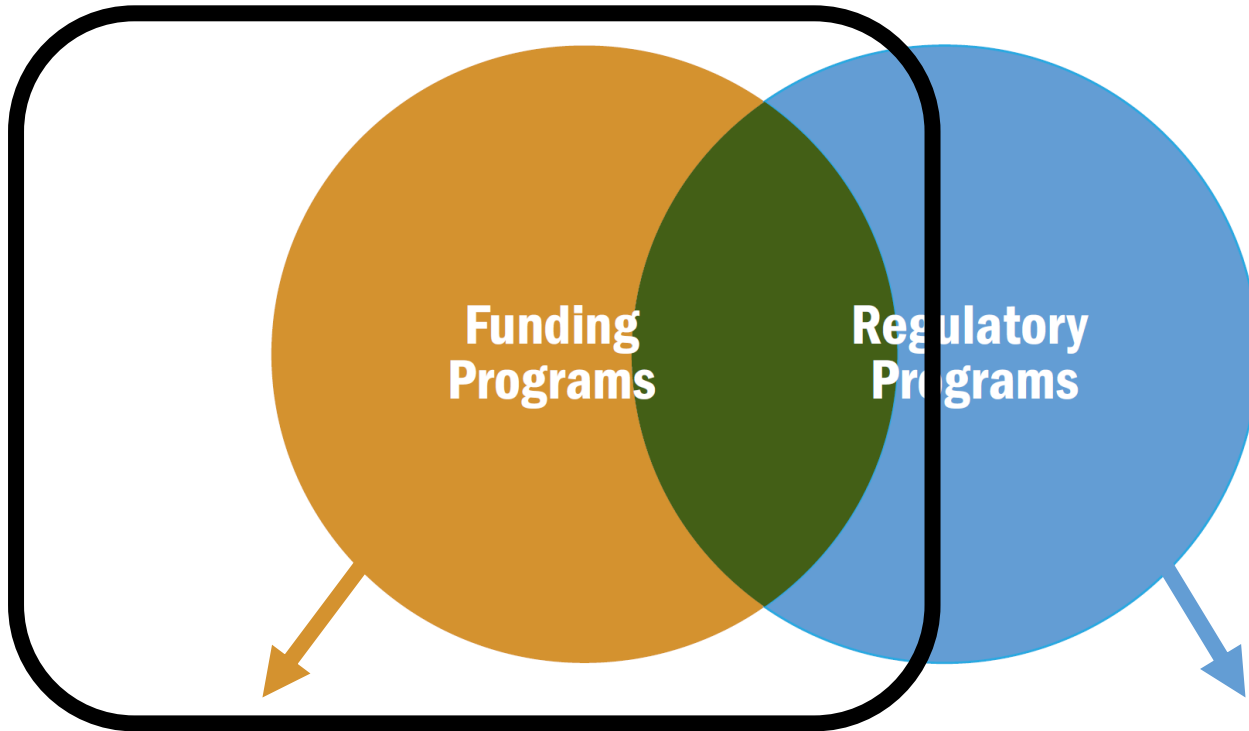
Estimate annual average phosphorus load reductions



Measure progress against TMDL base load & targets

EPA issues
report cards
by planning
basin on 5-
year
rotation

Tracking State Clean Water Investments



Funding Programs

Projects/best management practices completed through state funding programs and other programs where data available (e.g., federal, local)

Regulatory Programs

Projects/best management practices completed to comply with water quality regulations for agriculture, stormwater, and wastewater

SFY 2016

Establishing our baseline

VERMONT CLEAN WATER INITIATIVE 2016 INVESTMENT REPORT



Agency of Administration
Agency of Agriculture, Food and Markets
Agency of Commerce and Community Development
Agency of Natural Resources
Agency of Transportation

SFY 2017

Measuring progress over time

VERMONT CLEAN WATER INITIATIVE 2017 INVESTMENT REPORT



AGENCY OF ADMINISTRATION
AGENCY OF AGRICULTURE, FOOD & MARKETS
AGENCY OF COMMERCE & COMMUNITY DEVELOPMENT
AGENCY OF NATURAL RESOURCES
AGENCY OF TRANSPORTATION

Vermont Clean Water Initiative Annual Investment Report



Outreach and technical assistance measures to evaluate the level of clean water outreach and technical assistance provided by state agencies to support implementation of clean water funding and projects;



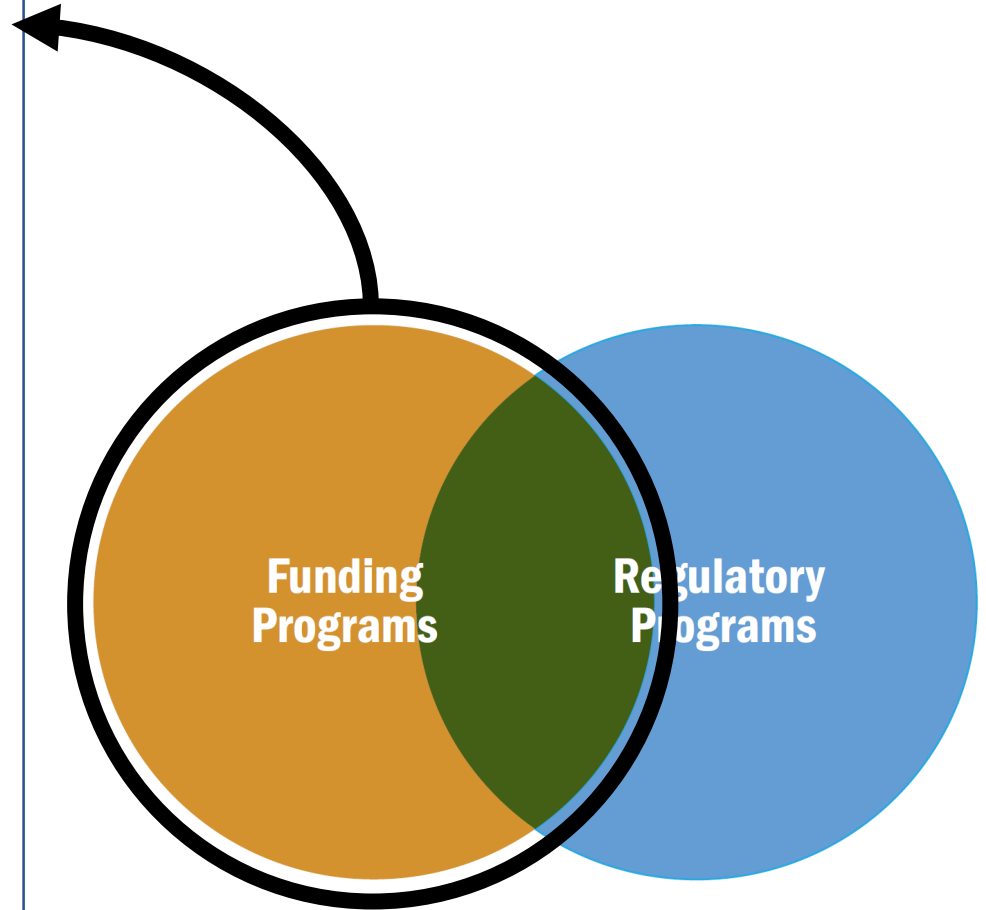
Investment measures on dollars invested in clean water restoration projects, addressing planning, design, and implementation of water quality improvement practices;



Measures of **project outputs**, quantifying the results of clean water restoration projects completed by project type; and



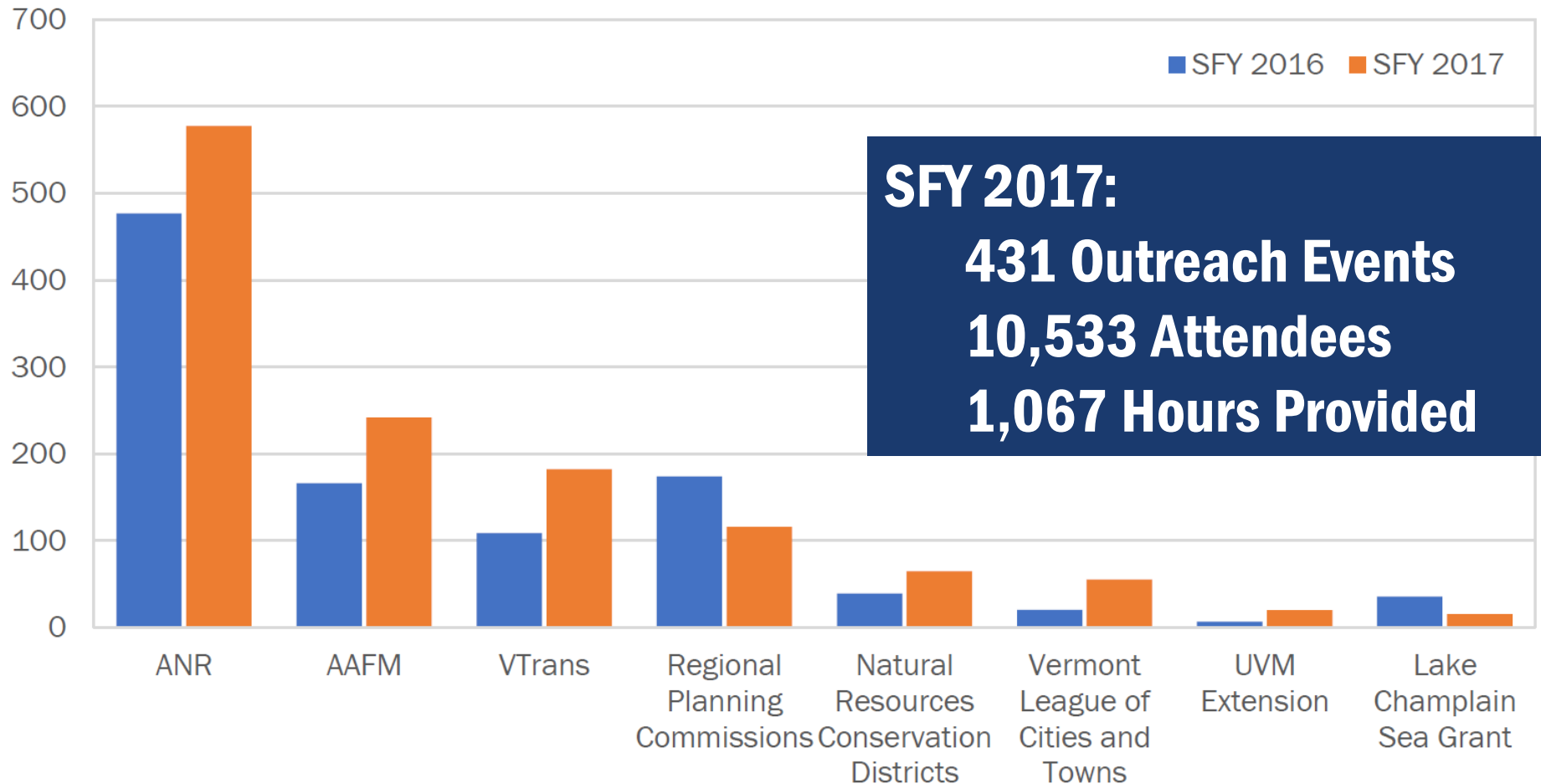
Measures of **environmental outcomes**, quantifying nutrient reductions achieved through State-funded clean water restoration projects.





Outreach and Technical Assistance Measures

Figure 2. Total hours of outreach provided to participants of workshops, trainings, and public/stakeholder meetings in SFY 2016 and 2017, by organization (excludes organizations reported as “other”)



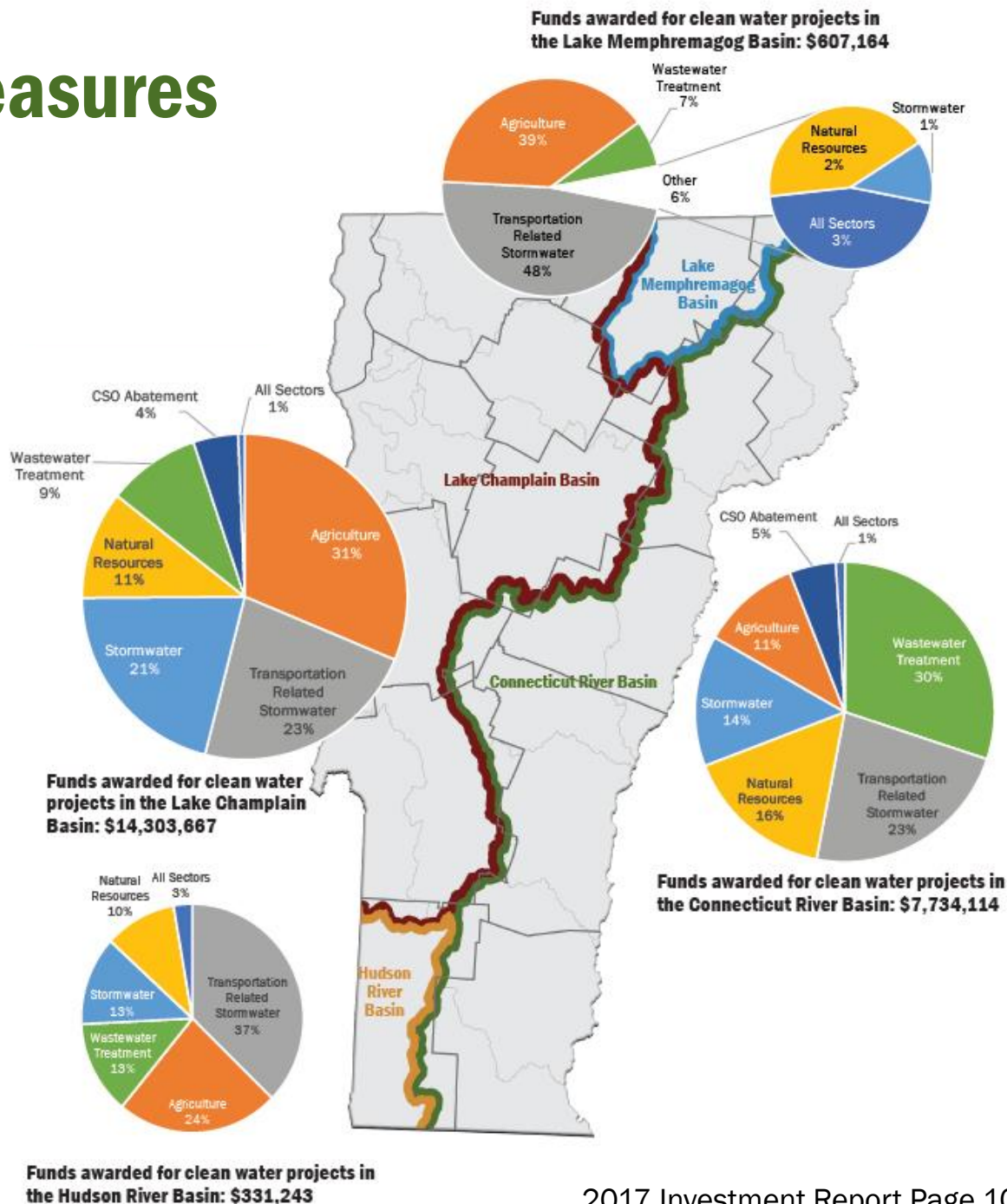


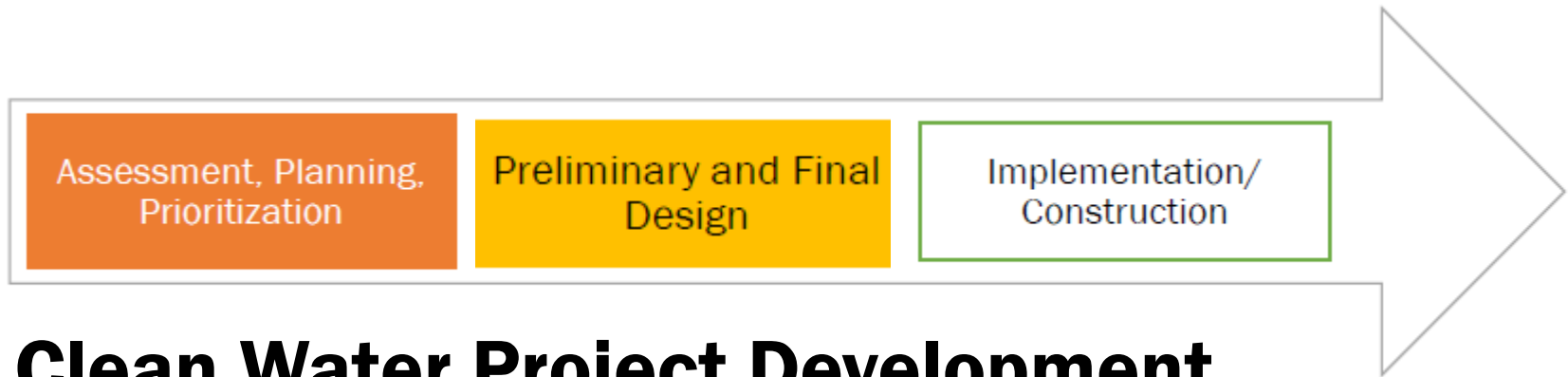
Investment Measures

114%

Increase in funds invested
in clean water projects
from 2016 to 2017

Total state funds invested
in clean water projects in
SFY 2017: \$22,976,188



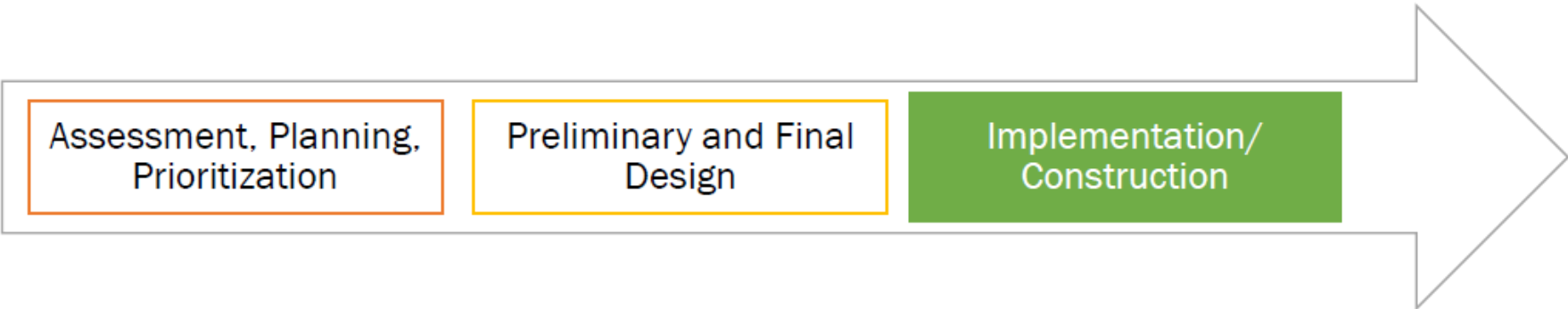


Clean Water Project Development

176 priority projects recommended for future design and/or implementation

116 road miles assessed and identified for future improvements

22 preliminary and 44 final designs completed for future implementation work



Assessment, Planning,
Prioritization

Preliminary and Final
Design

Implementation/
Construction

Why are these measures important?

- ✓ Implementation of TMDL requirements
- ✓ Implementation of Vermont Clean Water Act (Act 64 of 2015) requirements
- ✓ Compliance with Required Agricultural Practices
- ✓ Compliance with municipal stormwater permits
- ✓ Compliance with Municipal Roads General Permit
- ✓ Compliance with municipal wastewater discharge permits
- ✓ Compliance with the 2016 Combined Sewer Overflow (CSO) Rule
- ✓ Improved flood resiliency and flood hazard mitigation for public health and safety
- ✓ Support outdoor recreation, tourism, and property values
- ✓ Supports agricultural working lands
- ✓ Improved habitat function



Results of Agricultural Projects

Results of agricultural pollution prevention projects implemented in SFY 2017, statewide.

PROJECT RESULTS			BENEFITS					
Performance Measures	2016	2017	TMDL ¹ Implementation	Act 64 (2015) Implementation	RAP ¹ Compliance	Flood Resiliency	Working Landscape	Habitat Function
Acres of cropland and pasture treated by annual conservation practices	3,865	2,486*	✓	✓	✓		✓	
Acres of cropland and pasture treated by crop rotation and associated practices	572	0*	✓	✓	✓		✓	
Acres of cropland and pasture treated by forested buffers	366	178*	✓	✓	✓	✓	✓	✓
Number of barnyard/production area practices installed	39	87	✓	✓	✓		✓	
Acres of water quality protections within conserved agricultural lands	New in 2017	89	✓	✓	✓	✓	✓	✓

* USDA NRCS prioritized federal funding for field-based practices in SFY 2017, therefore, state-funded field practices decreased relative to SFY 2016, while state-funded barnyard/production area practices increased by more than 50 percent relative to SFY 2016. Federally funded projects are outside the scope of this report.



Results of Agricultural Projects

Results of agricultural pollution prevention projects implemented in SFY 2017, statewide.

POLLUTANT REDUCTION				
Total Phosphorus Reduced (Kilograms per Year)	2016	2017	Cumulative	Extent of Load Reduction Quantified
Annual agricultural conservation practices (active for at least 1 year)	443	283	283	53 percent of acres quantified in 2017 (projects in the Lake Champlain basin)
Agricultural crop rotation and associated practices (active for at least 5 years)	271	0	271	100 percent of acres quantified (cumulative) (projects in the Lake Champlain basin)
Forested riparian buffer restoration on agricultural lands (active for at least 15 years)	199	34	234	69 percent of acres quantified (cumulative) (projects in the Lake Champlain basin)

Figure 20. Before (left) and after (right) restoration of a forested riparian buffer on agricultural lands one year after implementation (will mature into fully forested buffer over time)



Figure 21. Before (left) and after (right) installation of livestock exclusion fencing and improved laneway and water crossing, completed by Poultney Mettowee Conservation District with ANR funding





Results of Natural Resources Projects

Results of natural resources restoration projects implemented in SFY 2017, statewide.

PROJECT RESULTS			BENEFITS			
Performance Measures	2016	2017	TMDL ¹ Implementation	Flood Resiliency	Outdoor Recreation	Habitat Function
Acres of forested riparian buffer restored through buffer planting	88	16	✓	✓	✓	✓
Acres of river corridor conserved through easements	141	209	✓	✓	✓	✓
Acres of floodplain restored	0	2	✓	✓	✓	✓
Stream miles enhanced and reconnected due to dam removal (also supports aquatic organism passage)	0	98	✓	✓	✓	✓
Acres protected for public access, recreation, forest conservation, and water quality	New in 2017	4,906		✓	✓	✓
Acres of water quality protections within conserved land (forested buffer area and wetland protection zones)	New in 2017	98	✓	✓	✓	✓



Results of Natural Resources Projects

Results of natural resources restoration projects implemented in SFY 2017, statewide.

POLLUTANT REDUCTION				EXTENT OF LOAD REDUCTION QUANTIFIED
Total Phosphorus Reduced (Kilograms per Year)	2016	2017	Cumulative	Pollutant reductions quantified for 25 percent of buffer acres in 2016 and 34 percent in 2017 (projects in the Lake Champlain and Memphremagog basins)
Forested riparian buffer restoration on non-agricultural lands	74	12	86	

Figure 24. Before (left) and after (right) relocation of 1,100 feet of Stowe's Recreation Path outside of fluvial erosion hazard zone and restoration and planting of 2 acres of floodplain, completed by Town of Stowe





Results of Transportation Related Stormwater Projects

Results of transportation related stormwater projects implemented in SFY 2017, statewide.¹

PROJECT RESULTS			BENEFITS					
Performance Measures	2016	2017	TMDL ² Implementation	Act 64 (2015) Implementation	MRGP ² Compliance	Municipal Stormwater Compliance	Flood Resiliency	Habitat Function
Miles of municipal road drainage improvements	1*	13**	✓	✓	✓	✓	✓	
Number of municipal road drainage structures installed	176*	68	✓	✓	✓	✓	✓	
Number of municipal road drainage and stream culverts replaced	4*	109**	✓	✓	✓	✓	✓	✓
Stream miles enhanced and reconnected due to replaced stream culverts (also supports aquatic organism passage)	27*	2.4*					✓	✓

* Represents results of ANR-funded projects only, therefore, results are likely underreported. Data were not tracked/reported by VTrans for applicable reporting periods.

** Data available for, and represent, two-thirds of projects completed in SFY 2017.



Results of Transportation Related Stormwater Projects

Results of transportation related stormwater projects implemented in SFY 2017, statewide.¹

POLLUTANT REDUCTION				EXTENT OF LOAD REDUCTION QUANTIFIED
Total Phosphorus Reduced (Kilograms per Year)	2016	2017	Cumulative	Pollutant reductions quantified for 38 percent of municipal road miles improved (projects in the Lake Champlain basin)
Road erosion control practices	4	22	26	

Figure 28. Before (left) and after (right) installation of a stone-lined ditch along Finel Hollow, Highland Gray, and Watkins Hill Roads in Poultney, completed by the Town of Poultney.





Results of Stormwater Projects

Results of stormwater treatment projects implemented in SFY 2017, statewide.

PROJECT RESULTS			BENEFITS		
Performance Measures	2016	2017	TMDL ¹ Implementation	Act 64 (2015) Implementation	Municipal Stormwater Compliance
Acres of impervious surface treated	0.3	86.3	✓	✓	✓

Figure 26. Before (top) and after (bottom) installation of bioretention system on Center Street in Northfield, completed by Central Vermont Regional Planning Commission





Results of Stormwater Projects

Results of stormwater treatment projects implemented in SFY 2017, statewide.

LOAD REDUCTION				EXTENT OF LOAD REDUCTION QUANTIFIED
Total Phosphorus Reduced (Kilograms per Year)	2016	2017	Cumulative	Pollutant reductions quantified for 41 percent of impervious acres treated (projects in the Lake Champlain basin)
Stormwater treatment practices	0.3	15.0	15.3	

Figure 27. Before (top) and after (bottom) installation of bioretention system on Morey Road in Hyde Park, completed by Lamoille County Conservation District



Table 14. Summary of Vermont's ability in SFY 2017 to account for nutrient pollution reductions by project type, basin, and nutrient of concern

Key			
Currently have ability to account for nutrient pollution reduction (new this year indicated by asterisk*)			
Do not currently have ability to account for nutrient pollution reduction			
Project Type	Lake Champlain	Lake Memphremagog	Connecticut River
Agricultural cropland and pasture conservation practices	Phosphorus	Phosphorus*	Nitrogen
Agricultural forested riparian buffers	Phosphorus	Phosphorus*	Nitrogen
Barnyard and production area management practices	Phosphorus	Phosphorus	Nitrogen
Agricultural easements for water quality	Phosphorus	Phosphorus	Nitrogen
River and floodplain restoration	Phosphorus	Phosphorus	Nitrogen
Riparian buffer restoration	Phosphorus	Phosphorus*	Nitrogen
Wetland restoration	Phosphorus	Phosphorus	Nitrogen
Forest erosion control	Phosphorus	Phosphorus	Nitrogen
Stormwater treatment practices	Phosphorus	Phosphorus*	Nitrogen
Road erosion control linear practices	Phosphorus*	Phosphorus*	Nitrogen
Road erosion control culvert replacements	Phosphorus	Phosphorus	Nitrogen
Wastewater treatment upgrades	Phosphorus	Phosphorus*	Nitrogen
Combined sewer overflow abatement	Phosphorus	Phosphorus	Nitrogen
Summary of status to expand tracking and accounting ability	Developing methodologies to account for phosphorus reductions from all project types (where feasible) in 2017-2018. Expanded ability to quantify road erosion controls in SFY 2017.	Lake Memphremagog TMDL finalized in 2017, providing phosphorus pollution rates for this region. Use Lake Champlain methods to estimate phosphorus reduction efficiencies by project type.	Need Vermont nitrogen land loading rates to quantify the nitrogen load for land treated by practices (depends on timing and results of EPA's regional Nitrogen Reduction Strategy).

Figure 31. Number of projects implemented by major basin, and number of projects with nutrient pollution reductions quantified

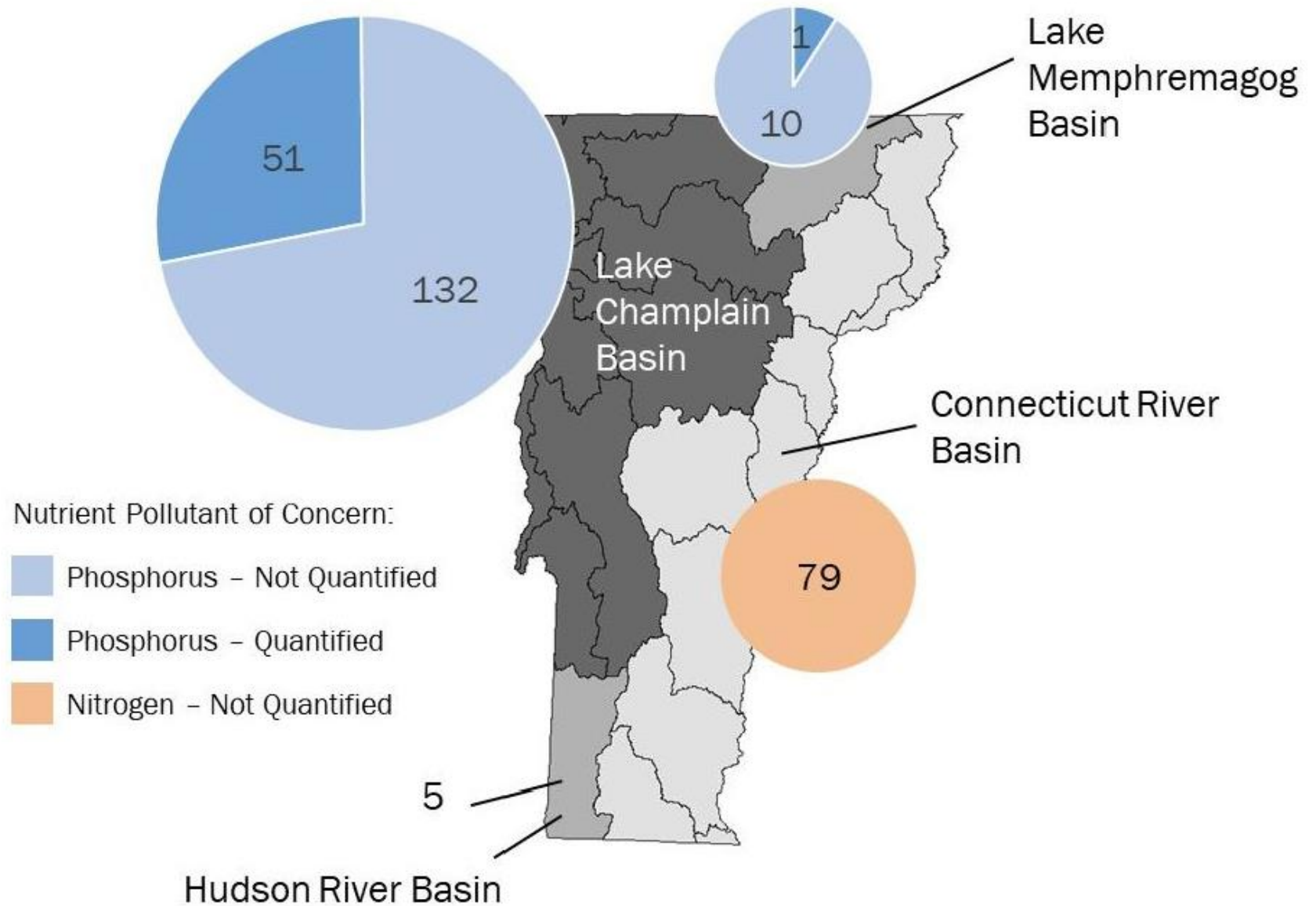


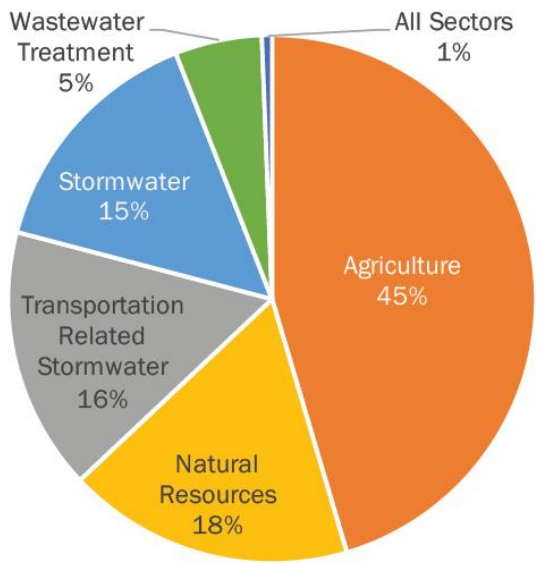
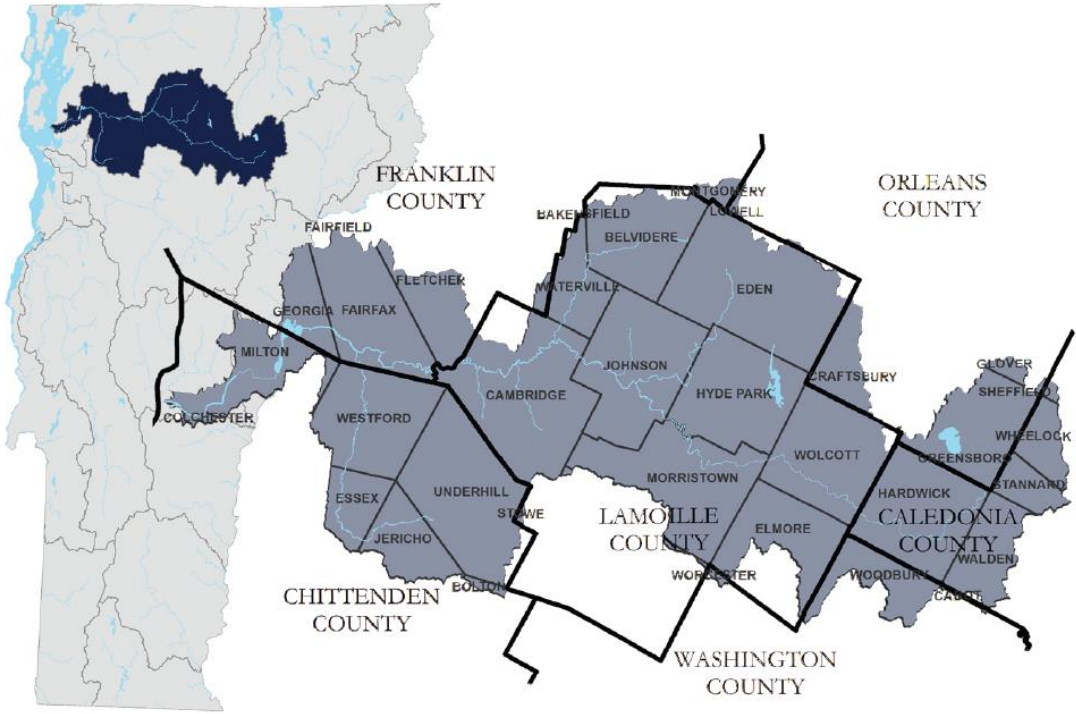
Table 15. Total phosphorus reduction achieved by state-funded projects in kilograms per year (kg/yr) by project type in SFY 2016, 2017, and cumulative

Project Type	2016 Estimated Phosphorus Reduction (kg/yr)	2017 Estimated Phosphorus Reduction (kg/yr)	Cumulative Estimated Phosphorus Reduction (kg/yr)
Annual agricultural conservation practices	443*	283*	283*
Agricultural crop rotation and associated practices	271	0	271
Forested riparian buffer restoration on agricultural lands	199	34	234
Forested riparian buffer restoration on non-agricultural lands	74	12	86
Stormwater treatment practices	0.3	15	15.3
Road erosion control practices	4	22	26
Total	992	366	915

* Annual agricultural conservation practices are only considered active for one year. Prior year annual practices do not count toward cumulative values.

Watershed Summaries – New this Year

Lamoille River Watershed Summary



State funding awarded in the Lamoille River watershed in SFY 2017, by sector
Total: \$1,589,446

STATE FUNDS AWARDED IN SFY 2017

Watershed Summaries – New this Year

RESULTS OF PROJECTS COMPLETED IN SFY 2017



Results of projects completed in SFY 2017, by sector, in the Lamoille River watershed.

AGRICULTURE PROJECT RESULTS

Acres of cropland and pasture treated by annual conservation practices	87
Acres of cropland and pasture treated by crop rotation and associated practices	NA
Acres of cropland and pasture treated by forested buffers	14
Number of barnyard/production area practices installed	29
Acres of water quality protections within conserved agricultural lands	NA

TOTAL PHOSPHORUS REDUCED (kilograms per year)

Annual agricultural conservation practices	21
Agricultural crop rotation and associated practices	NA
Forested riparian buffer restoration on agricultural lands	9

NATURAL RESOURCES PROJECT RESULTS

Acres of forested riparian buffer restored through buffer planting	NA
Acres of river corridor conserved through easements	35
Acres of floodplain restored	NA
Stream miles enhanced and reconnected due to dam removal (also supports aquatic organism passage)	NA
Acres protected for public access, recreation, forest conservation, and water quality	179
Acres of water quality protections within conserved land (forested buffer area and wetland protection zones)	15

TOTAL PHOSPHORUS REDUCED (kilograms per year)

Forested riparian buffer restoration on non-agricultural lands	NA
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TRANSPORTATION RELATED STORMWATER PROJECT RESULTS

Miles of municipal road drainage improvements	0.4
Number of municipal road drainage structures installed	NA
Number of municipal road drainage and stream culverts replaced	2
Stream miles enhanced and reconnected due to replaced stream culverts (also supports aquatic organism passage)	NA

TOTAL PHOSPHORUS REDUCED (kilograms per year)

Road erosion control practices	2
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PROJECT RESULTS: STORMWATER

Acres of impervious surface treated	4
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TOTAL PHOSPHORUS REDUCED (kilograms per year)

Stormwater treatment practices	4
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Vermont Clean Water Tracking Systems

- Tactical Basin Plan Implementation Tables
- Work completed through funding and regulatory programs
- BMP Accounting and Tracking Tool (BATT)

Ag Partners
Database

VTrans
Project
Database

Projects

Name	<input type="text"/>	Status	<input type="text"/>	Grant Number	<input type="text"/>
Project Type	<input type="text"/>	County	<input type="text"/>	Project ID	<input type="text"/>
Basin Plan	<input type="text"/>	Town	<input type="text"/>		
Grade Type	<input type="text"/>	Grade	<input type="text"/>		

Search

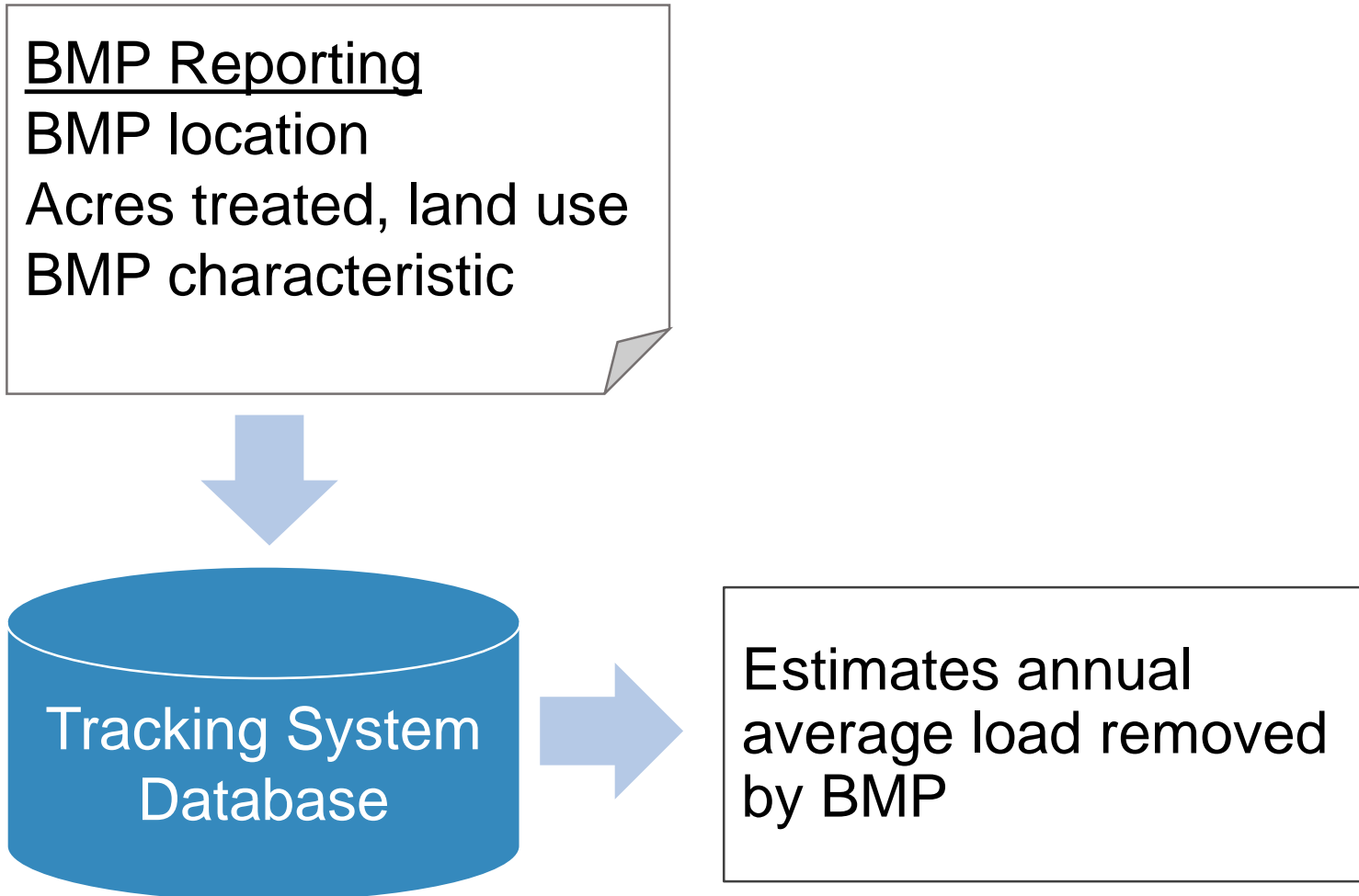
Clear

Add

To Report

		ID	Project Name	Project Type	Status	Grant Number(s)
Edit	View	89	Better Back Roads projects	Road Project	Implementation Funded	MOA-2015-ERP-01
Edit	View	155	Upper Winooski River Illicit Discharge Detection and Elimination - Follow-up Investigation	Stormwater - IDDE	Scoping Funded	Contract-31083
Edit	View	154	Crooked Creek Gully Restoration	Agricultural Pollution Prevention	Implementation Funded	Contract-31018
Edit	View	153	Montpelier Illicit Discharge Detection and Elimination	Stormwater - IDDE	Scoping Funded	Contract-30772
Edit	View	152	White River Illicit Discharge Detection and Elimination	Stormwater - IDDE	Scoping Funded	Contract-30768
Edit	View	66	Upper and Middle Connecticut River and Pasumpsic River Illicit Discharge Detection and Elimination	Stormwater - IDDE	Scoping Funded	Contract-29218
Edit	View	65	Memphamagog Illicit Discharge Detection and Elimination Completion	Stormwater - IDDE	Scoping Completed	Contract-28937
Edit	View	46	Crooked Creek Gully Restoration Designs	Agricultural Pollution Prevention	Design Completed	Contract-28911
Edit	View	69	Project Prioritization and Design for Implementation of the Cold River Corridor Plan	Floodplain/Stream Restoration	Design Completed	Contract-28843
Edit	View	35	Bennington and Pawlet Illicit Discharge Detection and Elimination Study	Stormwater - IDDE	Completed	Contract-28665
Edit	View	34	Bennington Infrastructure Stormwater Mapping Project	Stormwater - IDDE	Scoping Completed	Contract-27744
Edit	View	91	Follow-up on Illicit Discharges in the Otter Creek, Poultney River, and Lamoille River	Stormwater - IDDE	Scoping Funded	Contract-27743
Edit	View	2054	McKenzie Brook Nutrient Management Planning Project- UVM Extension (2016)	Technical Assistance	Completed	29109
Edit	View	2130	Green River Floodplain Attenuation Enhancement	Floodplain/Stream Restoration	Implementation Funded	2017-ERP-2-10
Edit	View	2129	Blackberry Ridge Streambank Erosion Grant	Road Project	Implementation Funded	2017-ERP-2-07
Edit	View	2128	Gully Stabilization, Mill Brook	Floodplain/Stream Restoration	Implementation Funded	2017-ERP-2-02
Edit	View	2145	Town Highway Garage Stormwater - Franklin	Stormwater	Scoping Funded	2017-ERP-1-22
Edit	View	2127	Dishmill Brook Stormwater Master Plan Phase 2	Stormwater Master Planning	Scoping Funded	2017-ERP-1-21

Tracking & Accounting TMDL Implementation: BMP Accounting & Tracking Tool (BATT)



BMP System

System ID: 62

Current

Prior Use

Linked Projects

Name	Northfield Village Green Bioretention VG5		
Latitude	44.14962	Longitude	-72.65694
HUC12			
Drainage Area	5 - Winooski River	Local ID	
Notes			

Completed? ☒

Land Use

+ Add Land Use

		ID	Land Use	Acres	Soil	Slope	P Load
Edit	Delete	442	Developed Impervious (WA)	5	NA	NA	5.5835
Edit	Delete	443	Developed Pervious (WA)	9	NA	NA	2.0745

BMP's

+ Add BMP

		ID	Type
Edit	Delete	1289	Bioretention

O&M

+ Add O&M

Loads and Reductions

Total Phosphorus Load	7.658	kg/year
Computed Phosphorus Reduction	4.04319	kg/year
Override Phosphorus Reduction	<input type="checkbox"/>	
Phosphorus Reduction	4.04319	kg/year

Update

Cancel

Clean Water Initiative Projects Dashboard

Prior State (Pre-January 2018)

Listing of projects with
basic identifiers

VERMONT OFFICIAL STATE WEBSITE

Watershed Projects

Name Status Grade
Project Type County Pro:
Basin Plan Town
Grade Type


ID	Project Name	Project Type
1	St. Johnsbury Stormwater Master Planning	Stormwater Master Planning
7	Towle Neighborhood Road Erosion Control - Planning and Design	Road Project - Final Design
9	Erosion Reduction at Hayes Road Stream Crossing	Floodplain/Stream Restoration - Implementation
11	Preparing Local Watersheds for Flood Resilience and Reducing Runoff in Lewis Creek	Stormwater - Preliminary Design
12	Whitney Brook and Black River Riparian Buffer Restoration	River - Planting
13	Lake Bomoseen Stormwater Master Planning	Stormwater Master Planning
15	Constructing Green Stormwater Infrastructure at the Waitsfield Town Office	Stormwater - Implementation
19	Enhancing Nutrient Management Plan Implementation with goCrop Software	Agricultural Pollution Prevention - Implementation
24	Moulton River Corridor Easement	River Corridor Easement Implementation
25	Nulhegan River Confluence Easements	River Corridor Easement Implementation

Good State/Phase 1 (Complete)

Individual project
summaries

Stormwater - Implementation

Northfield Village Green Bioretention Installation





Town: Northfield
County: Washington
Watershed: Winooski
Funding Amount: \$110,695
Funding Source: DEC Ecosystem Restoration Grant (Capital Fund, SFY 2016)
Description: This project is located behind the Village Green in Northfield. The result is the construction of a large bioretention basin which captures and treats surface stormwater runoff from 14 acres of the downtown, including 5 acres of impervious surface.
Partners: Central Vermont Regional Planning Commission

Project Status: Completed

Results:

- 4 kg/year phosphorus reduction
- 5 acres of impervious area treated



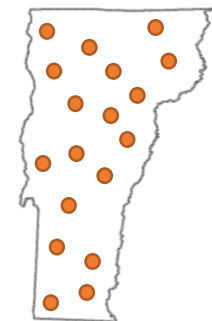
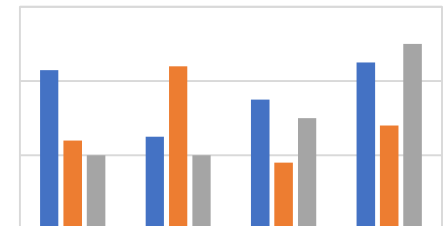
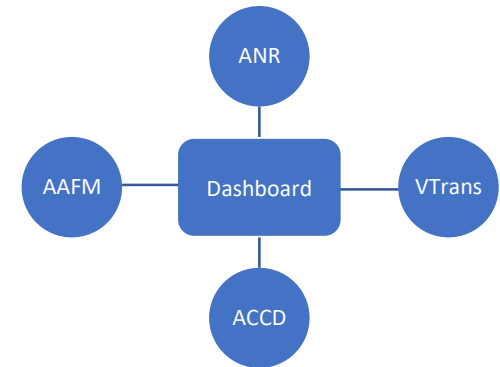
The back third of the parking lot covered by pavement before construction of the bio-retention area, behind the American Legion Hall.

After construction of the bio-retention area, with grass established, guardrail installed, and willow trees planted to capture and treat stormwater from in and around Northfield Commons.

For more information visit: <http://dec.vermont.gov/watershed/cwi/projects>

Great State/Phase 2-3 (2018)


Interagency data and
data visualization



Clean Water Initiative Projects Dashboard

Good State/Phase 1 (Complete): Individual project summaries

Stormwater - Implementation
Northfield Village Green Bioretention Installation




Town: Northfield
County: Washington
Watershed: Winooski
Funding Amount: \$110,695
Funding Source: DEC Ecosystem Restoration Grant (Capital Fund, SFY 2016)
Description: This project is located behind the Village Green in Northfield. The result is the construction of a large bioretention basin which captures and treats surface stormwater runoff from 14 acres of the downtown, including 5 acres of impervious surface.
Partners: Central Vermont Regional Planning Commission


Project Status:
Completed

Results:

- 4 kg/year phosphorus reduction
- 5 acres of impervious area treated



Northfield Parking Lot Before



The back third of the parking lot covered by pavement before construction of the bio-retention area, behind the American Legion Hall.

After construction of the bio-retention area, with grass established, guardrail installed, and willow trees planted to capture and treat stormwater from in and around Northfield Commons.

For more information visit: <http://dec.vermont.gov/watershed/cwi/projects>

2017 Ecosystem Restoration Project Summaries

Access one-page summaries of Ecosystem Restoration projects funded or completed during State Fiscal Year 2017 (July 1, 2016 - June 30, 2017)

Available here: <http://dec.vermont.gov/watershed/cwi/projects>

For more information:

Website	cleanwater.vermont.gov
Reports	http://dec.vermont.gov/watershed/cwi/cwf#reports
Projects	http://dec.vermont.gov/watershed/cwi/projects

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